OPERATING INSTRUCTIONS

FOR

UHF GRID DIP METER MODEL 101-B

Boonton ELECTRONICS Corporation

MORRIS PLAINS, NEW JERSEY

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SPECIFICATIONS

Frequency Range

300 mc to 1000 mc with 3 plug-in coils

Frequency Accuracy

Individually calibrated to ± 2.0%

Modulation

Unmodulated, 120 cycles internal modulation to approximately 30%, or modulation can be applied externally.

Power Supply

117 volts 60 cycles 30 watts

Tubes

1-type 6X4 Rectifier

1-type OB2 Voltage regulator

1-type 6F4 Oscillator

Weight

6-1/2 pounds

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UHF GRID DIP METER

Model 101-B

OPERATING INSTRUCTIONS

General Description

The 101-B Grid Dip Meter incorporates a unique series-tuned circuit capable of efficient operation in the UHF range from 300 to 1000 MC. This circuit accommodates much higher values of external coupling inductance than would normally be used in oscillators at these frequencies. Band switching may thus be done with plug-in coils of practical size that permit adequate coupling to test circuits.

This instrument may be operated either as a grid dip meter for locating resonance frequencies of passive networks, or as an absorption type frequency meter for measuring the frequency of an active circuit, or as a relative field strength meter for detecting changes in level of active circuits.

Means are provided for precision frequency comparison and determination by the beat method.

The instrument may be used as a source of calibrated variable-frequency signal power, having either modulated or CW carrier. Internal modulation of 120 cps is provided to about 30 %, or external modulation may be applied if desired.

General

The 101-B UHF Grid Dip Meter consists essentially of the Indicator Unit and the UHF Probe. Three plug-in coils are provided with each instrument, and care should be taken to see that these coils are not lost or damaged in any way. Unused coils shouls always be replaced in the special sockets provided on top of the Indicator Unit and never allowed to be scattered about on the work bench.

To operate the instrument, plug power cord in receptacle supplying approximately 117 volts, 60 cycle power. Turn on power switch and allow 30 seconds for warm-up.

Select the proper coil to cover the desired test frequency range as follows

Freq. Range	Coil Turns
650 - 1000	1
425 - 650	2
300 - 425	3

Plug desired coil into socket on UHF Probe and set selector switch on Indicator Unit for desired function indicated as follows:

Selector Setting	Function
Detector	Absorption Frequency Meter
	Relative Field Strength Indicator
	Modulated Signal Detector
Carrier	Tuned Circuit Resonance Indicator
	CW Signal Generator
	Marker Generator
	Oscillating Detector for precision frequency determination

ORDER NO. 386-A

Model 18AVT/WB-A
Vertical Radiator, Amateur Antenna

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PN 801000

TABLE OF CONTENTS

	page
General Description	1
Theory of Operation	1
Specifications	1
Choosing a Site	1
Assembly and Installation	2
M1 Section	2
M2 Section	2
M3 Section	2
M4 Section	2
M5 Section	3
M6 Section	4
M7 Section	4
Installing the Antenna	6
Hooking Up the Antenna	6
Converting English Measurement to the Metric System	7
Warranty	8
Parts List	9

LIST OF ILLUSTRATIONS

Figure		page
1	Antenna Assembly Dimensions	3
2	Top and Mount Details	5
3	Cutting Chart for Whip Rod	5
4	Roof Mounting Radials	6
5	Completed Installation	7
6	Typical VSWR Curves	8

Mod. Carrier	Modulated Signal Generator Internal modulation of 120 cps approx. 30% modulation External modulation may be applied if desired

Operation as Absorption Frequency Meter and Field Strength Indicator

After inserting appropriate coil, set function switch to ition marked DETECTOR and adjust SENSITIVITY control until icator meter reads between zero and 10. Now place probe in osition (see COUPLING TECHNIQUES, Figs 1-4) that will provide ficient inductive or capacitive coupling to the frequency rce under test. Slowly adjust the frequency dial on the probe, il a maximum upward meter deflection is noted on the Indica- Unit. After the indication is found, reduce coupling to id reaction between the UHF probe tank circuit and oscillator er test. Use the least coupling that will give adequate in- ation on meter. Under these conditions the calibrated fre- ncy dial indicates the frequency of the signal source under t. The degree of meter deflection is an approximate indi- ion of relative field strength in the vicinity of the pick- coil.

Signals having some form of modulation may be detected by of earphones or oscilloscope connected to phone jack.

3 Operation as a Tuned Circuit Resonance Frequency Indicator

After inserting appropriate coil, set function switch to position marked CARRIER and adjust frequency dial for maximum meter deflection. Adjust the SENSITIVITY control for a meter deflection of approximately 95. Now place probe in a position (see COUPLING TECHNIQUES, figs. 1-4) that will couple energy into the resonant circuit under test, slowly adjust the frequency dial on the probe until a sudden downward deflection of the indicator meter followed by an immediate upward swing is noted.

This meter deflection or dip results from a sudden transfer of energy from the probe oscillator to the resonant circuit under test. The maximum transfer of energy (maximum dip of meter) occurs when the probe is tuned to the resonance frequency of the test circuit.

It will be noted that the meter indication falls off at the high frequency end of each frequency band. When this occurs turn SENSITIVITY control in clockwise direction to increase meter deflection. When operating at the lower end of each frequency band it may be necessary to reduce the SENSITIVITY control to keep the meter from going off scale.

In order to obtain the best possible accuracy when determining the resonance frequency of a tuned circuit, the degree of coupling between probe and test circuit should be reduced to the least amount necessary to provide a readable meter deflection. Excessive coupling results in reaction between the test circuit and probe oscillator. For best results the probe should be steadied against some solid object when tuning in order to maintain a constant degree of coupling.

.4 Operation as an Oscillating Detector for Precision Frequency Determination

After inserting appropriate coil, set function switch to position marked CARRIER. Plug phones or oscilloscope in jack marked PHONES. Couple probe to frequency source under test and adjust dial slowly until an audible or visible signal is noted. Reduce coupling to the point where there is no tendency for the Model 101-B oscillator to "lock in" with the frequency under test. The point where an audible or visible signal can be noted is the frequency of the oscillator under test. This technique is particularly useful for checking stability of oscillators under varying temperature and/or voltage conditions.

3 APPLICATIONS

.1 Absorption Frequency Meter (Detector)

For checking the frequency and relative output of experimental oscillators.

For determining presence and relative magnitude of harmonics and parasitic oscillations in oscillators and amplifiers.

Signals having some form of audio modulation may be identified by use of phones or oscilloscope. This also applies to parasitic oscillations of a blocking character.

.2 Tuned Circuit Resonance Frequency Indicator

For determining or adjusting the resonance frequency of all types of tuned circuits including the capacitance and inductance effects of tubes and wiring, etc.

For determining or adjusting the resonance frequency of coaxial or open wire type transmission line tuning stubs.

For determining or adjusting the resonance frequency of cavity resonators.

For measuring the frequency characteristic response (or circuit Q) of input, output, and interstage coupling circuits.

For locating resonances in the mechanical parts and assemblies such as dials, shafts, shields, supports, etc.

3 Signal Generator (modulated or Unmodulated)

Power may be coupled out of the 101-B Grid Dip Meter by means of a small loop across the input to a coaxial cable or balanced transmission line properly terminated at the receiving end. (See COUPLING TECHNIQUES Fig. 5). In this way the 101-B may be used as a calibrated frequency source for those applications where the shielding requirements and voltage calibration of a conventional signal generator are not required.

One of the most frequent uses as a signal source will be as a marker generator for analyzing sweep frequency displays on an oscilloscope.

Note: To obtain best frequency accuracy avoid excessive coupling to load.

4 Accuracy

.1 Frequency Accuracy

The calibration accuracy of the Model 101-B UHF Grid Dip Meter is 2.0% and should indicate the resonance frequency of either passive or active resonance circuits to within this tolerance if precautions are taken to avoid excessive coupling as outlined in sections 2.2,2.3, and 3.3.

To obtain the best possible accuracy when checking frequency or stability of an oscillating circuit, the Model 101-B should be used as an oscillating detector with phones or oscilloscope to detect as close to zero beat as possible. This method also enables very loose coupling to be used and is particularly useful for establishing temporary calibration points using precision frequency standards when a higher degree of accuracy is required.

Note: Reasonable precautions should be taken when handling the Probe and Coils to avoid excessive shock or vibration, as this may result in frequency calibration errors or failure.

5 MAINTENANCE

5.1 Replacement of Tubes

The 101-B UHF Grid Dip Meter has been carefully engineered. It should give long service in the field and requires very little maintenance. The schematic diagram (see fig. 6) includes correct voltages at various points to aid in trouble-shooting.

In case of 6F4 oscillator tube failure:

1- Remove all screws around outer edge of Probe cabinet;

2- Carefully slide bottom off;

3- Remove old 6F4 tube from its socket;

4- Insert new 6F4 tube;

5- Turn instrument on and check for indication on the meter when the front panel switch is in CARRIER position;

6- Replace cabinet bottom.

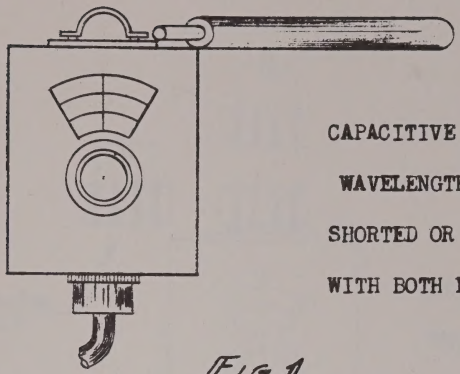
The frequency dial can be checked against any suitable standard and should remain within its - 2% calibration accuracy.

CAUTION: DO NOT under any conditions attempt to disassemble the Probe any more than outlined to replace oscillator tube. Special tools and fixtures are required to properly assemble and align.

SHIPPING INSTRUCTIONS

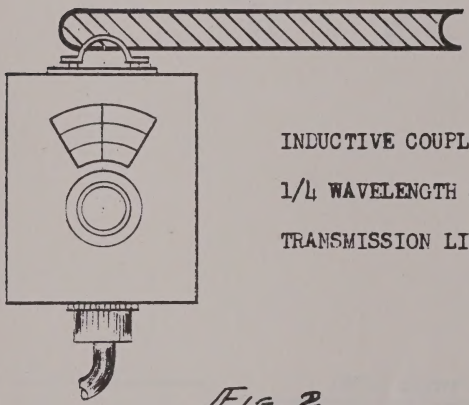
101-B Frequency Dial Must Be Set To Extreme Clock-Wise Postion Before Placing The Unit In Transit

COUPLING TECHNIQUES



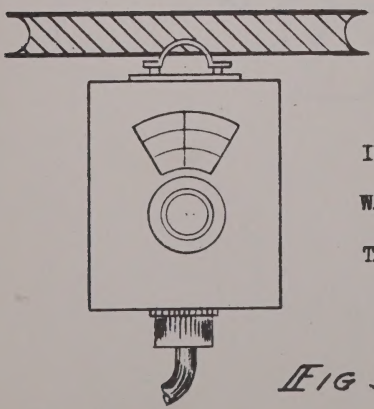
CAPACITIVE COUPLING TO OPEN END OF 1/4 WAVELENGTH SECTION WITH OTHER END SHORTED OR 1/2 WAVELENGTH SECTION WITH BOTH ENDS OPEN

FIG 1



INDUCTIVE COUPLING TO SHORTED END OF 1/4 WAVELENGTH SECTION OF BALANCED TRANSMISSION LINE

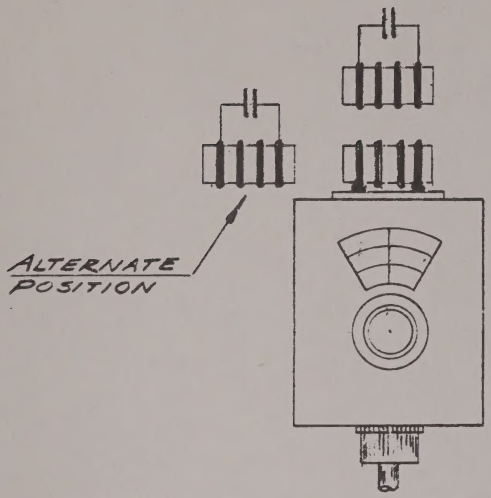
FIG 2



INDUCTIVE COUPLING TO CENTER OF 1/2 WAVELENGTH SECTION OF BALANCED TRANSMISSION LINE

FIG 3

Coupling Techniques



INDUCTIVE COUPLING TO PASSIVE TANK CIRCUIT OR ACTIVE OSCILLATOR COIL

FIG. 4

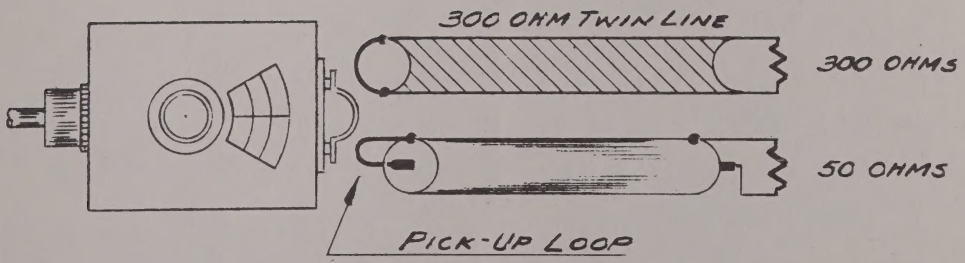


FIG. 5

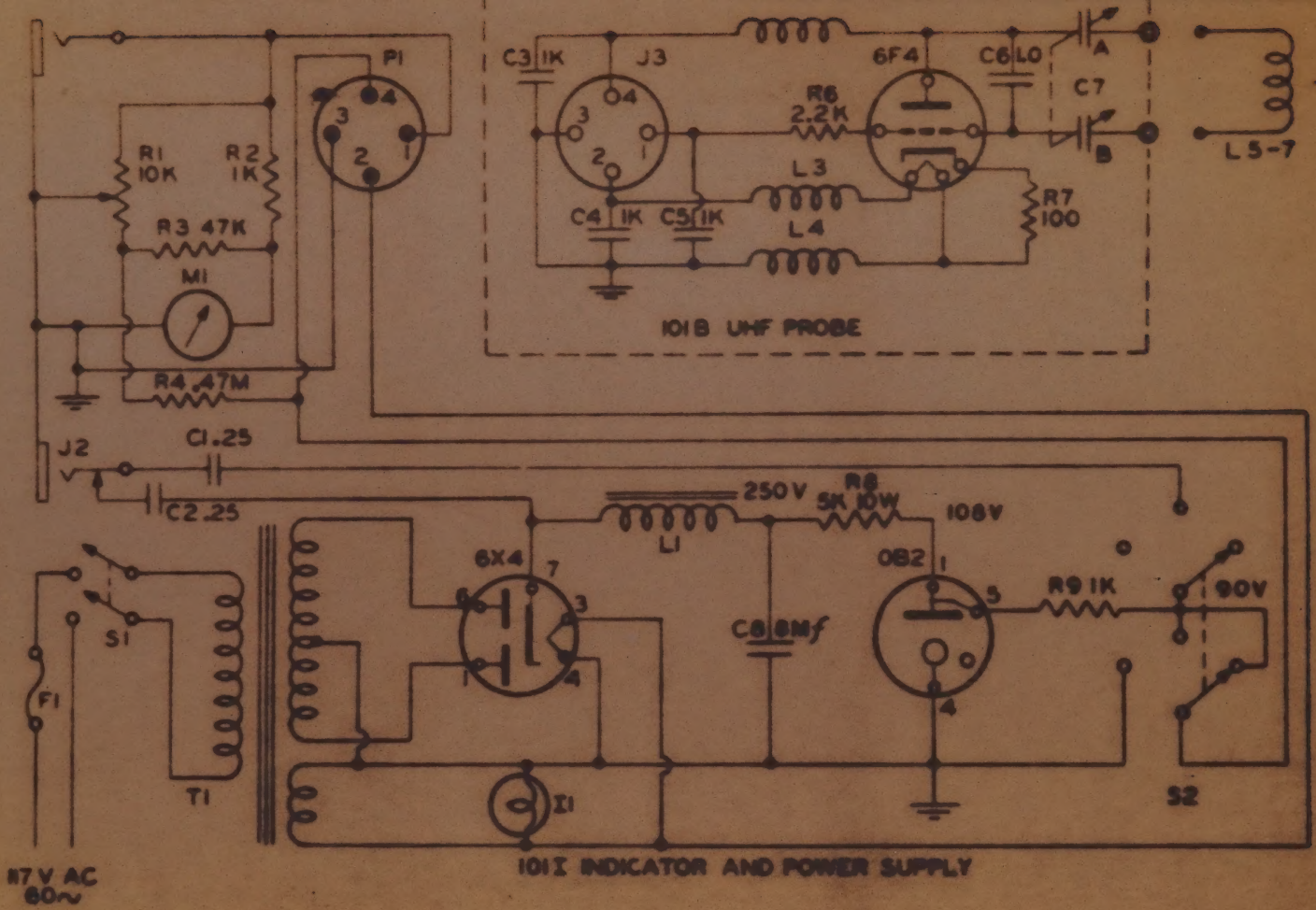


FIG. 6 UHF GRID DIP METER - SCHEMATIC

SHYERS BOOKBINDING CO.
NEWARK 8, N. J.